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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/581,752	12/20/2006	Bhavana Deore	74618-41 /sir	8507
7380	7590	08/17/2010	EXAMINER	
SMART & BIGGAR P.O. BOX 2999, STATION D 900-55 METCALFE STREET OTTAWA, ON K1P 5Y6 CANADA			FANG, SHANE	
			ART UNIT	PAPER NUMBER
			1796	
			NOTIFICATION DATE	DELIVERY MODE
			08/17/2010	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

us.mail@smart-biggar.ca

<b>Office Action Summary</b>	<b>Application No.</b> 10/581,752	<b>Applicant(s)</b> DEORE ET AL.	
	<b>Examiner</b> SHANE FANG	<b>Art Unit</b> 1796	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06/02/10.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-26 is/are pending in the application.  
     4a) Of the above claim(s) 10-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-9 and 15-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

- The amendment of claim 1 and new claims 15-26 have been supported by the original claims and 0026, 0053, and 0028.
- All previous rejection of claim 5 has been rendered moot by cancellation.
- All previous ODP, 102, and 103 rejections of claims 1-4 have been overcome by amendment.
- The previous 102 rejection of claims 6-7 over Shoji et al. has been **maintained**.
- The previous 102 rejection of claims 6-7 over Freund et al. has been **maintained**.
- The previous 103 rejection of claims 8-9 over Shoji et al. in view of Mattoso et al. has been **maintained**.
- The previous 103 rejection of claims 8-9 over Freund et al. in view of Mattoso et al. has been **maintained**.

### *Claim Rejections - Double Patenting*

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir.

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1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-2, 15-19 and 21-24 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-12 of copending Application No. 12/161235. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

As to claims 1-2, 15-19 and 21-24, 235' discloses a poly(3-aminophenylboronic acid) prepared by polymerizing 3-aminophenylboronic acid with NaF, oxidating agent, HCl, and etc. (claims 1-2, 5, 7-9, and 12). The reference is silent on "capable of converting between a self-doped form and a non-self doped form by a reversible chemical reaction wherein the reversible chemical reaction comprises complexation between boronic acid of the polyaniline polymer with a saccharide (D-fructose) in the presence of fluoride" of claim 1 and 15. However, this limitation particular to "capable of ... " is construed as an inherent property. The reference is silent on the hardness of instant claims 2, 16-19, 21-24. However, in view of the substantially identical composition, it appears that the adduct would have inherently possessed the claimed properties. See MPEP § 2112. In this particular case, no chemical or structural

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difference is shown between claimed and disclosed membrane materials. The disclosed poly(3-aminophenylboronic acid) would inherently exhibit aforementioned claimed hardness and be capable of said complexation.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

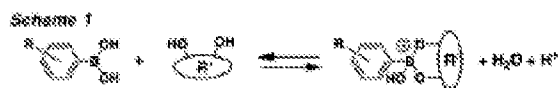
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 6-7, 15-19, and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Shoji et al. (JACS 2002, 124, 12486-12493) listed on ISP and IDS.

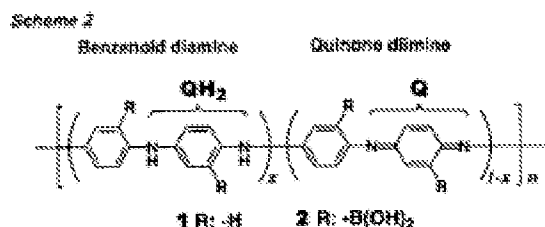
Also see ¶4 of the last action.

As to claims 1-2, 6-7, 15-19, and 21-24, Shoji et al. discloses a poly(3-aminophenylboronic acid) capable of converting between a water-soluble self-doped form and a water-insoluble non-self doped form by a reversible chemical reaction by exposing poly(3-aminophenylboronic acid) in D-fructose in PBS based on the following schemes (Pg. 12487, Experimental Section, 12488, col. 1, 12489, Fig. 2):

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and



Particular to amended claim 1, although Shoji is silent on the reversible reactions between boronic acid of the polyaniline with D-fructose in presence of fluoride, this limitation is construed as part of the inherent property. The resultant polymer meets the structures of claim 6, because formulae 2 and 3 of claim 6 are also construed as part of the inherent property of claimed polyaniline capable of converting between formula 2 and 3. What claimed is a polyaniline. These said limitations are met based on the inherency rationale of above ¶2.

Although the reference is silent on the hardness of instant claims 2, 7, 16-19, and 21-24, these two claims are rejected based on the same rationale as applied in above ¶2.

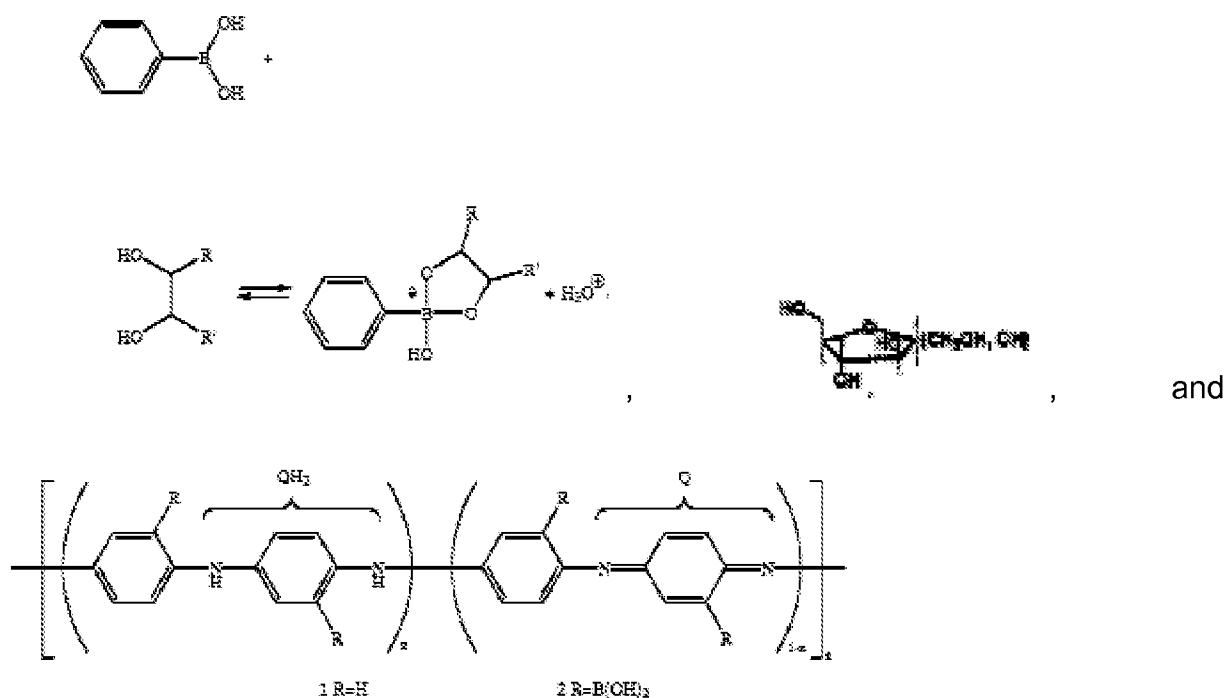
5. Claims 1-2, 6-7, 15-19, and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Freund et al. (US 20020029979) listed on ISP and IDS.

Also see ¶5 of the last action.

As to claims 1-2, 6-7, 15-19, and 21-24, Freund et al. discloses a poly(3-aminophenylboronic acid) capable of converting between a water-soluble self-doped

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form and a water-insoluble non-self doped form by a reversible chemical reaction by exposing poly(3-aminophenylboronic acid) in D-fructose in PBS based on the following schemes (0029-31, 0046-48, Fig. 2):



Particular to amended claim 1, although Shoji is silent on the reversible reactions between boronic acid of the polyaniline with D-fructose in presence of fluoride, this limitation is construed as part of the inherent property. The resultant polymer meets the structures of claim 6, because formulae 2 and 3 of claim 6 are also construed as part of the inherent property of claimed polyaniline capable of converting between formula 2 and 3. What claimed is a polyaniline. These said limitations are met based on the inherency rationale of above ¶2.

Although the reference is silent on the hardness of instant claims 2, 7, 16-19, and 21-24, these two claims are rejected based on the same rationale as applied in above ¶2.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-4, 8-9, 20, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shoji et al. (JACS 2002, 124, 12486-12493) listed on IDS and ISP in view of Mattoso et al. (Synthetic Metals, 68 (1994), 1-11) listed on IDS.

Also see ¶7 of the last action.

Disclosure of Shoji et al. is adequately set forth in ¶4 and is incorporated herein by reference.

Shoji et al. is silent on the MW of said polyanilines as recited in claims 3-4, 8-9, 20 and 25-26.

Mattoso et al. discloses increasing the MW to 64-90k of polyanilines by successive oxidation and further increasing the MW to 156k or 160k by using polyvinylsulfonic acid or ammonium peroxydisulfate for oxidative polymerization (Pg. 1, col. 1-2). Mattoso et al. teaches having high MW is highly desirable (Pg. 1, col. 1).



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One of ordinary skill in the art would obviously recognize to increase MW of a polymer for improving its film forming capability and mechanical strength.

Therefore, as to claims 3-4, 8-9, 20, and 25-26, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyaniline disclosed by Shoji et al. and increased MW to the claimed ranges in view of Mattoso et al., because the resultant higher MW polyaniline would yield improved film forming capability and mechanical strength.

8. Claims 3-4, 8-9, 20, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund et al. (US 20020029979) listed on IDS and ISP in view of Mattoso et al. (Synthetic Metals, 68 (1994), 1-11) listed on IDS.

Also see ¶8 of the last action.

Disclosure of Freund et al. is adequately set forth in ¶5 and is incorporated herein by reference.

Freund et al. is silent on the MW of said polyanilines as recited in claims 3-4, 8-9, 20, and 25-26.

Mattoso et al. discloses increasing the MW to 64-90k of polyanilines by successive oxidation and further increasing the MW to 156k or 160k by using polyvinylsulfonic acid or ammonium peroxydisulfate for oxidative polymerization (Pg. 1, col. 1-2). Mattoso et al. teaches having high MW is highly desirable (Pg. 1, col. 1). One of ordinary skill in the art would obviously recognize to increase MW of a polymer for improving its film forming capability and mechanical strength.

Therefore, as to claims 3-4, 8-9, 20, and 25-26, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyaniline disclosed by Freund et al. and increased MW to the claimed ranges in view of Mattoso et al., because the resultant higher MW polyaniline would yield improved film forming capability and mechanical strength.

### ***Response to Arguments***

The argument for allowance of amended claims has been fully considered but not persuasive.

Applicant's arguments (Pg.6-8) with respect to previous ODP rejections have been considered but are moot in view of the new ground(s) of ODP rejection.

Applicant's arguments (Pg.8-10, 12) with respect to previous rejections of claim 1 over Shoji concerning the new limitation of "in presence of fluoride" have been considered but are moot in view of the new ground(s) of rejection. See above ¶2.

Applicant has argued Shoji fails to disclose the use of saccharide during the polymerization (Pg.11). In the amended claim 1 and new claim 15, saccharide is used during the complexation in presence of fluoride. This limitation is construed as an "intended function" or product by process limitation and is met based on the rationale of above ¶2. What claimed in amended claim 1 is a boronic acid substituted polyaniline capable of "...", and the polyaniline of Shoji meets the claim.

Applicant has argued Shoji fails to disclose a self-doped polyaniline capable of "..." of claim 6 (Pg.12-14). Again, what claimed in claim 6 is a self-doped polyaniline

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capable of "...", and the polyaniline of Shoji meets the claim. See above ¶2.

Applicant's arguments (Pg.14-18, 12) with respect to previous rejections of claim 1 over Freund concerning the new limitation of "in presence of fluoride" have been considered but are moot in view of the new ground(s) of rejection. See above ¶3.

Applicant has argued Freund fails to disclose a self-doped polyaniline capable of "... of claim 6 (Pg.18-20). Again, what claimed in claim 6 is a self-doped polyaniline capable of "...", and the polyaniline of Freund meets the claim. The applicant further argued Freund fails to disclose the repeating unit of claim 6 (pg. 19). However, formulae 1 and 2 of claim 6 are the moiety on polyaniline where conversion occurs, and what claimed is a polyaniline. The  $B(OH)_2$  on the polyaniline of Freund is inherently capable of performing the claimed conversion. The applicant has further argued the polyaniline of Freund would not teach one of ordinary skill in the art to use such insoluble polymer as a sensor material (Pg. 19). However, converting from water insoluble to water soluble polyaniline would enable the polyaniline as a sensor material because of the change of water solubility. See above ¶3.

The applicant has argued the deficiency of Shoji and further argued Mattoso discloses the MW is decreased via using LiF in attempt to defeat the previous 103 rejections (Pg.20-25). The examiner asserts Shoji is not deficient but is silent on the MW of said polyanilines (See above ¶2, 7). Mattoso does not suggest polymerization in presence of fluoride and D-fructose, but this is not claimed either. The fluoride recited in claim 1 and 6 is used in complexation, not for polymerization or modifying MW. Using LiF together with agar and resultant decrease of MW is merely one finding of Mattoso.

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The MW is further increased by lowering the reaction temperature even LiF is used. Even using LiF, the resultant MW can be 36.9k (Table 1), within the range of claims 8 and 25. One of Mottoso's objectives is to increase the MW via using polyvinylsulfonic acid or ammonium peroxydisulfate for oxidative polymerization, and using LiF, NaCl,  $\text{CaCl}_2$ , and  $\text{LiNO}_3$  increases the MW of polymer produced. In light of this, in view of the reference in whole, Mottoso does not teach away from the present invention. Mottoso suggests the possibility of decrease of MW, but does not exclude the MW within the claimed MW range. The examiner asserts Shoji is not deficient but is silent on the MW of said polyanilines. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyaniline disclosed by Shoji et al. and increased MW to the claimed ranges in view of Mattoso et al., because the resultant higher MW polyaniline would yield improved film forming capability and mechanical strength.

The applicant has argued the deficiency of Freund and further argued Mattoso fails to disclose the complexation between boronic acid of polyaniline with saccharide and discloses the MW is decreased via using LiF in attempt to defeat the previous 103 rejections (Pg.20-25). Freund meets the limitation of complexation between boronic acid of polyaniline with saccharide (see above ¶3, 8). Based on the rationale of last ¶, Mottoso does not teach away from the present invention. The examiner asserts Freund is not deficient but is silent on the MW of said polyanilines. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the polyaniline disclosed by Freund and increased MW to the claimed ranges

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in view of Mattoso et al., because the resultant higher MW polyaniline would yield improved film forming capability and mechanical strength.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SHANE FANG whose telephone number is (571)270-7378. The examiner can normally be reached on Mon.-Thurs. 8 a.m. to 6:30 p.m. EST.. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

sf

/RANDY GULAKOWSKI/  
Supervisory Patent Examiner, Art Unit 1796